Retail organizations face distinct challenges in their efforts to deliver a superior experience to every customer, regardless of how, where, and when they are shopping. In this paper, we discuss how VMware SD-WAN™ by VeloCloud® helps retailers better engage with customers and enhance their shopping experience.

Meeting omnichannel expectations in retail
In an increasingly mobile, digital world, consumers have more choices than ever in terms of how, where, and when they shop. Retailers are under constant pressure to deliver a consistently outstanding omnichannel experience, compete more effectively, and boost profitability.

The emergence of digital technologies, social media and mobile devices has led to significant changes in the retail environment and has provided opportunities for retailers to redesign their marketing and product strategies. Today, customers tend to look for information and touch products in the physical store, and at the same time they are getting additional information from their mobile devices about offers and possibly better prices. An omnichannel approach allows organizations to allocate inventory availability and visibility across locations compared to each channel holding specific units.

An omnichannel retailer uses traditional methods of mass advertising integrated with emerging interactive channels. Websites, email offers, social media messaging and physical stores all show the same messages, offers, and products. The omnichannel concept not only extends the range of channels, but also incorporates the needs, communications and interactions between customer, brand and retailers. Features, like size charts, easy return policy and same-day delivery, have boosted e-commerce and promoted omnichannel shopping.

To deliver an omnichannel experience, retailers are turning to the cloud, mobile, artificial intelligence (AI), augmented reality, and other transformative technologies. They are seeking better ways to track every consumer’s journey; analyze and apply customer data for better insights; and deliver the right information at the right time—whether online, mobile, or in a store. For example, AI applications and analytics help clothing retailers better understand customers’ preferences; anticipate their needs and purchases; and provide relevant, context-rich content.

Shoppers expect an engaging, personalized experience, whether they are browsing in person or digitally. AI and augmented reality can support intelligent smart mirrors to let consumers “try on” outfits virtually, before they purchase them, and support dynamic, streamlined loyalty programs. These technologies can also support compelling retail offerings like coupons and promotional offers that shoppers can receive on their smartphones as they shop or automate complementary product suggestions in real time.
In order to deliver on the expectations of an omnichannel shopping experience, organizations are undergoing digital transformation. This digital transformation provides a compelling opportunity for retailers, but it also requires tremendous bandwidth, especially for media-rich content, such as video. Retail organizations require a scalable, flexible infrastructure that can provide the performance and availability they need to support an emerging wave of exciting new applications, as well as long-standing requirements like secure credit card transactions.

Overcoming limitations to deliver a world-class retail experience
Retailers understand that they must engage customers effectively on every channel to stay competitive; but all too often, their existing infrastructures are holding them back. They have limited resources and scaling those resources to hundreds or even thousands of retail locations is challenging. At the same time, retailers must keep costs in check and increase operational efficiencies so they can better compete and do more with less.

To deliver the superior experience customers expect, retailers need a versatile, secure platform that can support their most critical applications and services—regardless of location. It must:

• **Deliver the right performance on the right application:** To successfully support omnichannel interaction, retailers must manage and prioritize traffic for a variety of applications, including video, wireless, and Voice over IP (VoIP), and provide the best possible performance on mobile phones, tablets, in-store kiosks, and other devices.

• **Secure and manage sales transactions:** Retailers must securely manage a variety of point-of-sale (POS) transactions in-store, online, and even from mobile shoppers. They need to make it fast and frictionless for consumers to shop, while maintaining security as well as meeting Payment Card Industry (PCI) compliance and other regulations.

• **Enable secure and reliable guest Internet access:** Today’s tech-savvy shoppers often browse the Internet while shopping. According to Forrester, smartphones will be used in over one-third—or more than $1 trillion—of total U.S. retail sales at some point in the process of buying something in 2018, including research, price comparisons and purchases.¹

• **Maximize system uptime for continuous revenue:** Even a short service interruption can impact revenues, frustrate consumers, and damage retailer reputations. Organizations need a solution that delivers high availability and complete insight and control. If a problem does arise, they need assurance that they can quickly manage and resolve issues remotely, without sending a network team professional to a site.

• **Do more in a limited space:** Space is at a premium for retailers, most of whom have limited network closet space. They need small-footprint technology solutions that are efficient, easy to manage, and consume minimal power and resources. In pop-up store environments, all networking capabilities need to be delivered in a single form factor, because large equipment stacks are prohibitive.

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Building the Network for the Retail Store of the Future

Enhancing interaction on every channel with VMware SD-WAN

Flexible and secure, enterprise-grade VMware SD-WAN enables retailers to overcome real-world limitations and deliver a delightful, engaging customer experience—however and wherever they are shopping. A single, manageable platform lets network teams add cost-effective Internet links without compromising control over optimal application access. It lets them aggregate multiple broadband links, such as LTE, or other transport to support cloud applications, real-time voice and video, and other latency-sensitive applications. This lets retailers serve customers in digital and physical environments consistently and cost-effectively.

Let us take a closer look at the benefits retailers can unleash by accelerating digital transformation with VMware SD-WAN.

Internet as transport

VMware SD-WAN enables secure and reliable connectivity over any transport type. What happens when retailers migrate to a more agile, flexible infrastructure foundation? They unlock dramatic savings in capital expenses (CapEx) and operational expenses (OpEx) by reducing complexity and space requirements, while increasing efficiency. Retailers can set up broadband connections much faster and at a lower cost than with private links. Corporate applications and other offerings can be accessed over the Internet-based overlay network. At the same time, enhancing operational efficiency frees up network teams to focus on more strategic business concerns.

Quality of experience

Increasing consumer expectations for fast, personalized services, together with escalating bandwidth and performance requirements within stores and properties, are pushing retailers to deliver services faster and more efficiently. Retailers must ensure applications can be accessed with the same efficiency, no matter where they’re located.

VMware SD-WAN enables retailers to enhance the service level, performance, and capacity of broadband Internet links as well as hybrid networks. The VMware SD-WAN Dynamic Multipath Optimization™ (DMPO) technology, together with deep application recognition, aggregates multiple links and steers traffic over the most optimal links to ensure a consistent and reliable user experience.

Secure and reliable connectivity between retail locations can be facilitated by VMware SD-WAN Edges located at each retail location, without having to traverse the data center. Cloud and Internet access is enabled by connecting VMware SD-WAN Edges at each of the retail locations to global VMware SD-WAN Gateways.

Blackouts are serious threats for retail locations, and pose a problem when they occur (Figure 1). If a link failure takes place, sessions to software as a service (SaaS) applications will get interrupted. The DMPO feature of VMware SD-WAN seamlessly transfers traffic to another link. It can ensure that the flow can be moved without interruption compared to the long convergence times that are typical of legacy routers.

VMware SD-WAN Overlay

FIGURE 1: VMware SD-WAN DMPO blackout protection.
To minimize brownouts over a single link, VMware SD-WAN can dynamically duplicate packets for real-time flows when packet loss above a set threshold is detected (Figure 2). It will leverage multiple links (if available) to duplicate packets. The receiving VMware SD-WAN Edge takes the first packet that arrives and discards any duplicates.

A quality score is measured by the VMware SD-WAN Edges and reported to the VMware SD-WAN Orchestrator (Figure 3). It shows the quality of the individual underlays, as well as the SD-WAN overlay, and provides insight into any impairment that occurred, and how the system reacted to remediate it.

DMPO remediates the effects on the end-user experience by employing link steering, forward error correction (FEC) and de-jitter buffering measures. The end result, marked “After,” shows a sanitized overlay network where the business-critical applications are no longer impacted by the impaired underlays.

Routing protocols only act in the event of a blackout condition where the active transport link becomes disconnected. Brownout conditions where ongoing packet loss occurs, impacting the end user experience, are not detected by routing protocols—and will impact performance and be difficult to troubleshoot.

According to Forbes, nearly 80% of retailers say it’s “business critical” that they integrate omnichannel experiences into their stores and by 2021, 79% of retailers will be able to personalize in-store shopping experiences for customers because they’ll be able to know they’re in the store.²

Compliance and security
Retail firms depend on credit card payments for many of their core business functions. That’s why it is important to choose an SD-WAN solution that is not only PCI-compliant, but also facilitates simplification of the PCI audit process.

The Payment Card Industry Data Security Standard (PCI-DSS) is a worldwide information security standard, provided by the PCI Security Standards Council, that helps organizations safeguard the processing of credit card payments and prevent fraud. The VMware SD-WAN network lets organizations protect cardholder data, implement strong access control and change management measures, and monitor network security.

VMware SD-WAN helps retail organizations achieve PCI compliance in a simple, efficient and cost-effective manner. Retailers can work through PCI audits by employing PCI as a service and separate credit card traffic with segmentation. Retailers and service providers can establish their own PCI-compliant environments with VMware SD-WAN. Network teams can leverage VMware SD-WAN Attestation of Compliance (AOC) to simplify and accelerate their own PCI audit process.

Traffic segmentation
VMware SD-WAN enables traffic segmentation that is critical for retailers who must isolate different types of traffic while maintaining specific business policies. For example, regulations mandate segregation of sensitive PCI credit card traffic from corporate traffic and guest Internet traffic, so organizations can apply segmentation to comply with these requirements.

With VMware SD-WAN, retailers can easily create separate, distinct virtual private network (VPN) topologies, firewall and business rules to separate traffic as they wish. They can direct all guest Wi-Fi traffic to a secure gateway or firewall, while running voice traffic between sites over a dynamic secure link between retail locations. VMware SD-WAN supports automated firewall and VPN rules for each segment, across the network and the cloud.

Segments can be used to strictly segregate network use between different business units in an organization. These segments are automatically extended over the VMware SD-WAN overlay and can provide access to different environments in the data center. Organizations can also employ segmentation to isolate guest traffic from corporate applications and resources. Each segment has its own unique topology, as well as completely independent application priority and security policies. In this example, social networking applications are blocked for the PCI segment, but are allowed on the guest segment.
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VMware SD-WAN also helps retail organizations to address external security threats with a stateful, context-aware firewall for applications, users, and devices. With support for one-click VPN for retail-to-data center and retail-cloud traffic, the solution can scale efficiently across thousands of retail locations.

VMware SD-WAN can also enable security services as a virtual network function (VNF) to operate inline on VMware SD-WAN Edge device hardware, making it an ideal solution for environments where space is limited, and power or cooling budgets are tight or where device consolidation is necessary. This also facilitates managing multiple services from a single management portal—the VMware SD-WAN Orchestrator, delivering continued simplicity.

Service chaining is also supported as an integral part of the VMware SD-WAN solution, so organizations can easily direct traffic to cloud-hosted security services, including URL filtering, firewalling and access management.

Efficient management

Like most organizations, retailers accumulate new infrastructure components, connections, and services over time. VMware SD-WAN helps reduce point products and provides uniform management across the network, improving insight and visibility into the network traffic from every branch. Network teams gain centralized management control for faster, more proactive troubleshooting across all their retail locations. Centralized, efficient management also helps them get more from limited resources.

VMware SD-WAN lets organizations take advantage of automation capabilities for zero touch deployment. Activation, configuration, and ongoing management are all handled in the cloud, without requiring expensive IT professionals to go onsite. When it’s time to apply a new policy, a single click can distribute it across all retail locations through a centralized, cloud-based VMware SD-WAN Orchestrator.

VMware SD-WAN can create a dynamic inventory for all sites and connected links. It can also provide details on link quality, and performance of connected providers by location, to deliver performance insight and metrics.

Let’s take a closer look at how a variety of retail firms have transformed their operations with VMware SD-WAN.
In focus: global clothing retailer delivers a superior customer experience

A major global clothing retailer with more than 500 locations worldwide faced changing customer needs and challenges as the company expanded. The firm was committed to delivering the best possible service to customers, both in-store and online, but was unsure if its existing infrastructure could keep pace with growing demands.

To compete more effectively, the retailer decided to transform its network to build a dynamic, responsive, efficient organization. The retailer’s in-house staff of network teams was small, so simple deployment and management was key.

After evaluating a variety of options, the clothing retailer migrated its retail locations from a traditional wide area network (WAN) environment to VMware SD-WAN. Installation was simple, and no downtime was required. Stores that were at the end of their private link contracts were converted to a broadband Internet connection and the VMware SD-WAN Edge was installed on-premises. Most sites were up and running within an hour. With its new SD-WAN solution in place, the clothing retailer is realizing:

- **Nonstop transaction readiness:** Under the previous architecture, a network outage made it impossible for a retail location to process sales. With VMware SD-WAN, if the primary broadband connection fails, traffic can be immediately rerouted over an LTE backup, for maximum business continuity.

- **Fast, efficient location launches:** Instead of waiting for days or weeks for a carrier to install a new circuit, the retailer can apply a preset store profile and have its VMware SD-WAN Edge device operational within minutes.

- **Dependable in-store online browsing:** For customers that have a special clothing requirement that is not available in-store, the retailer offers on-site online ordering, delivering the bandwidth and performance customers need for an optimal buying experience.

- **Support for VoIP:** The solution enables the firm to modernize its phone system by migrating sites to VoIP without the need for additional switches, reducing the hardware footprint at each location.

With VMware SD-WAN, this innovative retailer can take advantage of increased network performance and improved visibility, as well as offer a superior consumer experience.

In focus: flooring distributor builds a more agile, expandable organization

A leading distributor of tile, carpet, and other flooring supplies was facing competitive pressure and growing pains. Its network team was seeking to integrate disparate company networks and platforms, speed time to market, and develop an infrastructure that would better scale to meet growing customer needs.

With 25 locations, the firm knew that its reliance on its legacy network would impede its ability to achieve this integration and put a significant burden on the network team. The firm was also seeking to minimize redundancy and move beyond its costly, limited Multiprotocol Label Switching (MPLS) network.
Working closely with an SD-WAN partner, the distributor deployed VMware SD-WAN, with VMware SD-WAN Edges at each location, to connect to the cloud using the VMware SD-WAN Gateways. The solution used the VMware SD-WAN Orchestrator for complete network visibility and centralized management. VMware SD-WAN delivered:

- **Support for cloud applications and services**: VMware SD-WAN enabled a fast, secure connection to all locations, enabling the distributor to move more of its services to the cloud. The firm has also deployed VoIP throughout its sites for additional savings and improved communications.

- **Rapid deployments**: Opening new locations became fast and easy. With VMware SD-WAN, the flooring distributor was able to establish connectivity quickly at any location, with any available connection.

- **Serious cost savings**: Migrating from its existing MPLS environment has enabled the distributor to save hundreds of thousands of dollars per year by taking advantage of inexpensive broadband links, more proactive management, and cloud hosting and services.

VMware SD-WAN enables the flooring distributor to enhance visibility and improve the security of its POS transactions, prioritizing and isolating PCI traffic over non-critical data, to serve customers more efficiently and securely.

**Before and after: the SD-WAN difference**
Retailers employed separate IPSec tunnels for each traffic type, such as PCI transactions and guest traffic, on public links. They often configured separate virtual local area networks (VLANs) on MPLS links as well.

![FIGURE 6: Retail before VMware SD-WAN.](image-url)
VMware SD-WAN lets retailers enjoy simple, faster deployment for store locations with an all-in-one VMware SD-WAN Edge device. Applications can be moved to the cloud and can be accessed via VMware SD-WAN Gateways. These cloud applications are protected and optimized by VMware SD-WAN DMPO.

VMware SD-WAN lets stores use multiple Internet links for reliability. All the links are active-active (private and public links). Retailers send all the traffic to the SD-WAN overlay tunnel, and all links can be used for business-critical traffic.

With VMware SD-WAN network segmentation, a single overlay can carry all of a location’s traffic. Network segments can be carried through to the data center and terminated on a VMware SD-WAN Edge device.

FIGURE 7: Connecting retail locations with VMware SD-WAN.

What you need to know

With VMware SD-WAN retail organizations can deliver an engaging, enjoyable omnichannel experience to every customer, every time.

• DMPO enhances application performance and enables seamless failover connections for the WAN.

• VMware SD-WAN lets retail organizations simplify and streamline operations with centralized management, maximizing uptime and helping network teams get the most from limited resources.

• Retailers can benefit from PCI compliant VMware SD-WAN components for secure credit card payments. Segmentation allows separation of credit card, guest, and corporate retail traffic, with different topologies and distinct application and firewall rules for each segment.

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